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Joseph C. Gilman

Iowa Agricultural Experiment Station

Lois H. Tiffany

Iowa Agricultural Experiment Station

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The McCormick Effect in Cultures of *Diaporthe phaseolorum* var. *batatatis* from Soybeans¹

By JOSEPH C. GILMAN AND LOIS H. TIFFANY

One of the problems of the investigator of parasitic fungi is that of obtaining ascospore stages of the organism in cultures derived from diseased plant parts. Such cultures often produce mycelium or mycelium and conidia without the corresponding ascospore stage. With the advent of our knowledge of heterothallism such sexual stages have often been grown artificially by the mating of self-sterile strains. A few cases of heterothallism, in which the sexes are segregated on separate thalli, are also known. Finally, with homothallic fungi that fruit with difficulty in ordinary culture some advance on the problem has been made by students of the nutritional requirements of fungi, particularly under the leadership of Lilly (3). These workers have found that supplementation of the substrate with vitamins often leads to fruition in cultures that have hitherto been considered sterile or lacking in one or more spore stages.

In the course of studies on *Diaporthe phaseolorum* var. *batatatis* (Harter and Field) Wehm. the cause of stem blight of soybean, a peculiar phenomenon relating to the production of the perithecia of the culture was observed. In certain plate cultures that had become contaminated with colonies of *Alternaria tenuis* auct. Sensu Neergaard the colony of *Diaporthe* produced its perithecia around the periphery of the contaminating colony before perithecia appeared in any other part of the plate (Figure 1). These perithecia were normal in every respect and produced normal ascospores.

The phenomenon described above is considered to be similar to that observed by Heald and Pool (1) with *Melanospora pampeana* Speg. and later worked out by McCormick (2) in her investigations on perithecial development of *Thielavia* on the roots of violets. She ascribed the stimulation of perithecial development on the part of the cultures of *Thielavia* to supplementary nutrients supplied by the growth of the contaminating fungus; in her case, cultures of *Aspergillus umbrosus*, *Cladosporium fulvum*, *Aspergillus glaucus*, *Eurotium amstelodami* and *Fusicladium pirinum* as well as by water extracts from these fungi and from yeast and

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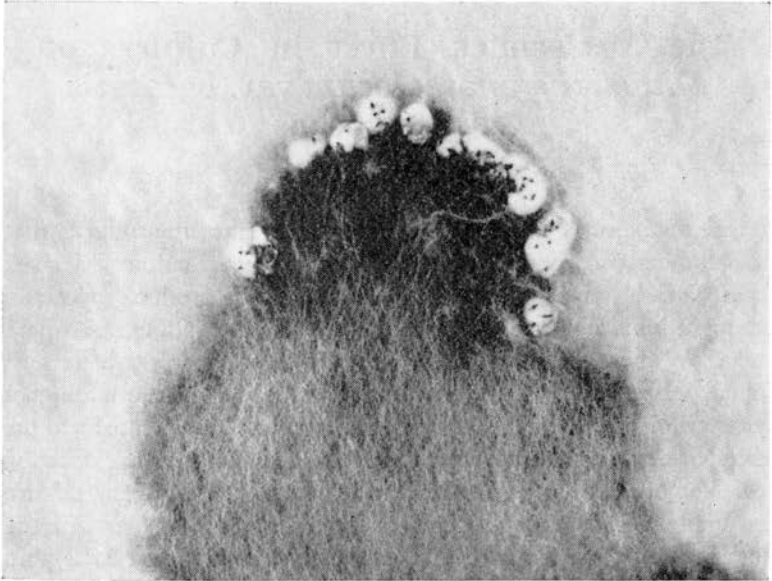


Figure 1. *Diaporthe phaseolorum* var. *batatatis* fruiting on margin of a colony of *Alternaria tenuis*.

takadiastase. The *Thielavia* apparently failed to obtain sufficient nourishment from the substrate by its own enzymes and synthetic processes to support the development of perithecia.

In view of the work of Timnick, Lilly and Barnett (3) on *Diaporthe phaseolorum* that was derived from a culture supplied them by Welch (4) it was considered worthwhile to add this note to the accumulating material concerning the nutrition of this fungus. They were able to stimulate this strain of *Diaporthe* to produce pycnidia and alpha conidia by means of enriched vitamin supplements in the media under the added stimulation of light. Welch and Gilman reported no conidial production in their cultures of the fungus.

These findings indicate that in *Diaporthe phaseolorum* var. *batatatis* we have a fungus that is very dependent on its substrate for the nutritional elements necessary for fruition.

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